*The Beagle, Records of the Museums and Art Galleries of the Northern Territory*, 2007 **23**: 111–117

# A new species of carp gudgeon, *Hypseleotris* (Pisces: Gobioidei: Eleotridae), from the Katherine River system, Northern Territory

HELEN K. LARSON

*Museum and Art Gallery of the Northern Territory*
*GPO Box 4646, Darwin, NT 0801, AUSTRALIA*
*helen.larson@nt.gov.au*

ABSTRACT

A new species of eleotrid, *Hypseleotris barrawayi*, is described from the upper Katherine River, of the Daly River system of the Northern Territory. It differs from others in the genus by having distinct dark vertical bars on the body, the first and second dorsal fins are banded horizontally with light and dark pigment, the caudal fin usually has several dusky bars or rows of spots, has a dark bar on the pectoral base, 26 vertebrae, preopercle with scales, lateral scales usually 32, and predorsal scales scattered along midline of nape, not reaching the eye and often absent altogether. The species is known only from the upper reaches of the Katherine River, with a preferred habitat of clear quiet water with shelter, such as near steep banks with overhanging vegetation, where it may form loose schools.

KEYWORDS: Northern Territory, Katherine River, Eleotridae, *Hypseleotris*, new species.

## INTRODUCTION

The freshwater fishes of the Northern Territory are still in the process of being discovered (Larson and Martin 1990). In 1988, John Bywater, a biologist working for Energy Resources of Australia (ERA), undertook a freshwater fish survey of 18 upstream sites within Kakadu National Park, Northern Territory (Bywater 1988). Among the 36 species recorded, he collected specimens of an unidentified *Hypseleotris* from Sleisbeck Camp (an abandoned uranium mine) on the upper Katherine River. John made these specimens available to the author and they were determined to belong to a new species. From 1991, further specimens were obtained from the area and from other localities in the Katherine system and deposited in the collection of the Museum and Art Gallery of the Northern Territory for further study.

## METHODS

Measurements were taken using electronic callipers and dissecting microscope. Counts and methods generally follow Hubbs and Lagler (1970), except as indicated below. Pterygiophore formula follows Birdsong *et al.* (1988). Transverse scale counts backward (TRB) are taken by counting the number of scale rows from the anal fin origin diagonally upward and back toward the second dorsal fin base. Head length is taken to the upper attachment of the opercular membrane. Although both left and right pectoral ray numbers were recorded, the right pectoral fin count is that used in the description and table. The segmented or branched caudal ray pattern (e.g. 9/8 or 9/7) is the number of segmented caudal rays attaching to the upper and lower hypural plates respectively. Numbers in parentheses after counts indicate the number of specimens with that count, or range of counts. Vertebral counts and other osteological information was obtained by clearing and double-staining.

Abbreviations for institutions referred to are: AMS, Australian Museum, Sydney; NTM, Museum and Art Gallery of the Northern Territory (previously Northern Territory Museum), Darwin; QM, Queensland Museum, Brisbane; WAM, Western Australian Museum, Perth.

## SYSTEMATICS

### *Hypseleotris barrawayi* sp. nov.
### Barraway's gudgeon

(Figs 1–4; Tables 1–6)

*Hypseleotris* sp. cf. *kimberleyensis*. – Larson and Martin 1990: 87 (creek near Sleisbeck, Katherine River).

*Hypseleotris* sp. – Wilson and Brooks 2004: 11 (Daly/Katherine Rivers).

*Hypseleotris* sp. nov. Katherine River. – Thacker and Unmack 2005: 2, 4, 6–10 (Katherine River).

**Material Examined.** HOLOTYPE – NTM S.15616-002, 32.5 mm SL male, Nibuldakya Aquatic Survey, Gimbat Creek, Katherine River, 13°33'S, 133°3.3'E, coll. D. Wedd, July 1997. PARATYPES – NTM S.16394-001, 44(13-28), Sleisbeck Camp creek and backflow billabong on N side of creek, beside abandoned Sleisbeck mining camp, 13°47.5'S, 132°51'E, 0.5 m depth, sand, logs, leaf litter, no flow, coll. H. Larson, J. Bywater, R. Williams, H. Nesbitt, 23 October 1991; WAM P.32867-001, 5(19–28), same data as previous; AMS I.44100-001, 4(22–25.5), same data as previous; NTM S.12389-001, 10(21.5–30.5), site 32, Sleisbeck, Katherine River, coll. J. Bywater, 9

August 1998; NTM S.16431-001, 4(44.5–58), Sleisbeck Creek, maintained in ERA aquaria from October 1988 to 1990; NTM S.16430-001, 1(44.5), billabong by Sleisbeck creek camp, October 1988, coll. J. Bywater; NTM S.15614-001, 9(21–31.5), site 8, Nibuldakya Aquatic Survey, swamp on tributary on upper reaches Katherine River, coll. D. Wedd, N. Smit, 7 July 1997; NTM S.15612-001, 9(18–44), site 4, Nibuldakya Aquatic Survey, gorge tributary on upper reaches Katherine River, 13°18.7'S, 133°6.5'E, coll. D. Wedd, N. Smit, 7 July 1997; QM I.38089, 3(25.5–29.5), same data as previous; NTM S.15616-001, 2(25.5–32), Nibuldakya Aquatic Survey, Gimbat Creek, Katherine River, 13°33'S, 133°3.3'E, coll. D. Wedd, July 1997.

*Additional material (not used in description).* NTM S.12531-001, 21, Sleisbeck, Katherine River; NTM S.12531-001, 6, Sleisbeck, Katherine River; NTM S. 15124-001, 50, Centipede Dreaming Gorge, Katherine River; NTM S.15128-001, 10, base of 'Elseya Falls' (13°45.6'S, 133°07.5'E), Katherine River; NTM S.15611-001, 3, north gorge, tributary of Katherine River; NTM unregistered, 1 Sleisbeck, Katherine River; NTM S.15610-001, 11, upper reaches Katherine River; NTM S.15613-001, 2, Jackys Creek, Katherine River; NTM S.15615-001, 3, rock pool on tributary of Katherine River.

**Diagnosis.** *Hypseleotris barrawayi* sp. nov. differs from its congeners by a combination of characters: distinct dark vertical bars on side of body, first and second dorsal fins banded with light and dark pigment, caudal fin plain or with several dusky bars or rows of spots, dark bar on pectoral base darkest dorsally and diffuse on ventral part of fin base, 26 vertebrae, preopercle with scales, postdorsal scale count usually 9, lateral scale count 30–34, usually 32, and predorsal scales scattered along midline of nape and/or above opercle and preopercle, not reaching eyes and often absent altogether.

**Description.** Based on 31 specimens, 22.5–58 mm SL. Counts for holotype (Fig. 1) indicated by asterisk, and number of specimens with a given count in parentheses.

First dorsal spines V (in 1), VI* (28), VII (10; second dorsal rays I,9 (4), I,10* (26), I,11 (1); anal rays 1,9 (2), I,10* (15), I,11 (13); pectoral rays 14 (7), 15* (22), 16 (2); segmented caudal rays 14 (1) or 15* (30), in 8/7 pattern; branched caudal rays 6/4 (1), 6/5* (29), 8/5 (1); longitudinal scale count 30 (7), 31 (5), 32 (11), 33 (6), 34* (1); transverse scales backward 10 (4), 11 (9), 12 (14), 13 (2), 14* (1); predorsal scale count 0–23, 16 in holotype; post-dorsal scale count 8 (7), 9* (20), 10 (2); gill rakers on outer face of first arch 2+10 (1), 3+9 (2), 3+10 (1), 4+9 (1), 4+10 (1), 4+12 (1); vertebrae 12+14 (2), 13+13 (13), 13+14 (1); dorsal pterygiophore pattern 3-2211 (8); 2 epurals (1); 8 anal pterygiophores anterior to first haemal spine (1) (Tables 1–5).

Body slender and compressed, more so posteriorly; body depth at anal origin 13.9–22.9% of SL (Table 6); body depth at pelvic fin origin 16.3–21.8 % of SL. Caudal peduncle long, length 21.8–31.0% of SL. Caudal peduncle depth 10.3–12.7% of SL. Head somewhat compressed, forming rough triangle (apex dorsally) in cross-section, usually deeper than wide at posterior preopercular margin, head length 23.6–29.3% of SL, depth at posterior preopercular margin 52.5–78.8% of HL, width at posterior preopercular margin 47.0–73.0% of HL. Large (captive adult) males with somewhat convex nape but none with 'hump'. Mouth short and oblique, forming an angle of about 30° with body axis; jaws ending anterior to eye, below posterior nostril. Upper jaw length 25.8–34.3% of HL; lips narrow; lower lip fused to chin anteriorly, side of lip free; no mental frenum present. Anterior naris at end of very short tube just above upper lip; posterior naris oval, close to anterdorsal margin of eye. Eye width 24.1–31.8% of HL. Interorbital broad, its width approximately equal to eye width, 24.7–33.6% of HL. Snout short, rounded to almost square in dorsal view, gently rounded to slightly pointed in side view, its length about equal to eye width, 21.2–28.6% of HL. Gill opening moderate, extending forward to under posterior margin of preopercle or slightly further forward (but not reaching eye). Gill rakers slender

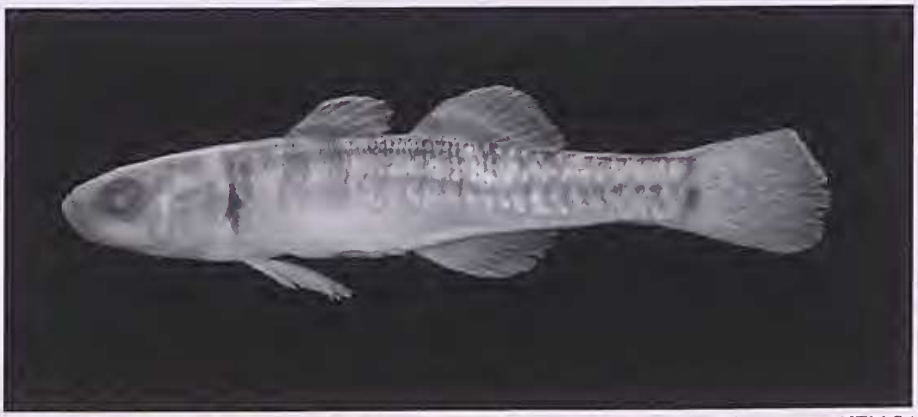

**Fig. 1.** *Hypseleotris barrawayi* sp. nov., holotype, 32.5 mm SL male, Gimbat Creek, Katherine River system, NTM S.15616-002.

**Table 1.** Frequency distribution of dorsal and anal fin soft ray counts in northern Australian *Hypseleotris* species; data on other species from Hoese and Allen (1983).

| | Second dorsal fin rays | | | | Anal fin rays | | | |
|---|---|---|---|---|---|---|---|---|
| Species | 8 | 9 | 10 | 11 | 9 | 10 | 11 | 12 |
| *H. aurea* | - | 1 | 8 | - | - | 1 | 7 | 1 |
| *H. barrawayi* sp. nov. | - | 4 | 26 | 1 | 2 | 15 | 13 | - |
| *H. compressa* | - | 24 | 7 | - | 1 | 16 | 14 | - |
| *H. ejuncida* | - | 3 | 10 | - | 1 | 10 | 2 | - |
| *H. kimberleyensis* | - | 1 | 12 | 1 | 1 | 9 | 4 | - |
| *H. regalis* | 1 | 4 | 18 | - | 2 | 4 | - | - |

**Table 2.** Frequency distribution of pectoral fin ray counts (right fin) in northern Australian *Hypseleotris* species; data on other species from Hoese and Allen (1983).

| | Pectoral fin rays | | | | |
|---|---|---|---|---|---|
| Species | 13 | 14 | 15 | 16 | 17 |
| *H. aurea* | - | 1 | 6 | 3 | - |
| *H. barrawayi* sp. nov. | - | 7 | 22 | 2 | - |
| *H. compressa* | - | 7 | 20 | 1 | 1 |
| *H. ejuncida* | - | 6 | 6 | - | - |
| *H. kimberleyensis* | - | 8 | 5 | - | - |
| *H. regalis* | 7 | 12 | 2 | - | - |

**Table 3.** Frequency distribution of post-dorsal counts in northern Australian *Hypseleotris* species; data on other species from Hoese and Allen (1983).

| | Post-dorsal scales | | | | | | |
|---|---|---|---|---|---|---|---|
| Species | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| *H. aurea* | - | - | - | 2 | 1 | 3 | 3 |
| *H. barrawayi* sp. nov. | - | 7 | 20 | 2 | - | - | - |
| *H. compressa* | - | 14 | 20 | - | - | - | - |
| *H. ejuncida* | - | 11 | 1 | - | - | - | - |
| *H. kimberleyensis* | 2 | 7 | 2 | - | - | - | - |
| *H. regalis* | 2 | 19 | - | - | - | - | - |

near angle of arch and becoming progressively shorter (but still slender) and more widely spaced anteriorly, longest raker (below angle of arch) nearly as long as gill filaments (which are short); rakers on inner face of first and other arches short and stubby. Tongue tip blunt to slightly concave, may be slightly folded, giving tridentate appearance. Teeth small, sharp and curved; teeth in both jaws in three to five rows anteriorly, closely packed, curving inward, teeth in innermost tooth row slightly larger than others; rows narrowing toward side of each jaw, so that posterior half of jaw with only one or two rows of teeth present. No vomerine teeth. No headpores. Sensory papillae in reduced transverse pattern (Fig. 2).

Scales on body reaching forward to above pectoral fin base or further forward on to side of nape to above preoperele; most body scales ctenoid, with cycloid scales under first dorsal fin so that ctenoid scales form a wedge along side of body to behind pectoral fin; scales posterior to below first dorsal fin larger than those anteriorly. Prepelvic region with embedded small cycloid scales, anteriormost third usually naked. Pectoral fin base with variably sized patch of small cycloid scales, base occasionally naked (in five specimens). Predorsal scales small, cycloid, variably present, may be completely absent (in seven); scales embedded or partly so, nearly always non-imbricate, scattered in groups in rough line along midline of nape and above operele and preoperele in no particular pattern. Scales on side of head cycloid, firmly embedded; operele with patch of cycloid scales, varying from three to many scales nearly covering operele; preoperele with patch of scales at posteroventral corner, may be one or two rows extending along lower part of preoperele below eye, and may be patch of scales directly behind eye which may coalesce with ventral scales. Belly scales with embedded cycloid scales at least on posterior half; midline may be naked.

First dorsal fin low, rounded to somewhat rectangular in form, no spines elongate, fin falling short of or just touching second dorsal fin spine when adpressed; adpressed first dorsal length 16.2–20.0% of SL, not differing between males and females. Anteriormost second dorsal and anal rays longest but not greatly so, fin bases short, posterior rays falling well short of caudal fin base; anteriormost second dorsal and anal rays unbranched. Pectoral fin pointed, slender, central rays longest, 18.3–24.9% of SL; upper and lowermost two rays unbranched. Pelvic fin length 14.6–26.1% of SL; pelvic fins slender, pointed, fifth rays longest, fin rays with one branch point; fins falling short of anus. Caudal fin truncate to slightly rounded; caudal fin length 19.6–27.5% of SL.

*Colouration in alcohol.* Head plain brown to light brown, paler ventrally in females; branchiostegal membranes dusky, always darker than breast. Body light brown, yellowish ventrally, with about 10–13 equally spaced narrow brown bars crossing dorsum, first bar crossing nape above operele, bars reaching down on to side of abdomen anteriorly, bars progressively becoming much shorter posteriorly. Scales on body narrowly margined with pale to dark brown, usually giving finely reticulate appearance. On mid-side of body, row of short dusky grey vertical bars running from abdomen to caudal fin base, bars may coalesce with brown bars crossing dorsum, or

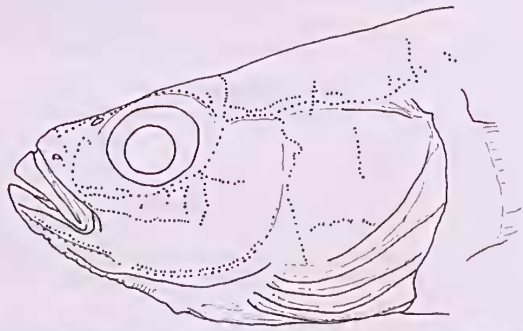

**Fig. 2.** Papillae pattern of 44 mm SL male *Hypseleotris barrawayi* sp. nov., from Katherine River tributary, NTM S.15612-001.

be indiscernible. Distinct blackish, dark grey to greyish spot or short vertical blotch present on lower half of caudal fin base. Pectoral fin base with elongate dense dark brown to blackish blotch on dorsal half; blotch may form curved dark mark down length of base, becoming more diffuse ventrally.

First dorsal fin transparent to dusky, with broad dusky grey base, a transparent to faintly dusky band above this and dusky submarginal band of about same width as transparent band; fin margin transparent at least between first four dorsal fin spines, rest of fin margin dusky. Second dorsal fin with broad dusky grey basal band, narrower transparent band along middle of fin, a broad dusky grey submarginal band, transparent fin margin from first segmented ray to about seventh ray, rest of margin dusky. Anal fin plain dusky grey to dark grey, with narrow whitish to transparent margin. Caudal fin usually plain light dusky; some specimens (such as holotype, heavily pigmented specimens) have 3–5 slightly oblique narrow diffuse bars crossing basal half of fin, bars may break up into rows of dusky spots. Pectoral fin transparent with fin rays narrowly margined with melanophores. Pelvic fins translucent to faintly dusky.

Large specimens (over 40 mm SL) tend to be plainer in colour, with the short grey bars on the side of body and the brown saddles across dorsum almost indiscernible; unpaired fins darker. The submarginal bands on the dorsal fins tend to be much darker brown, and the broad dusky basal area on the second dorsal fin may have diffuse brownish spots along its distal margin.

*Live colouration* (Figs 3, 4). Head and body translucent light grey to brownish, bluish-white on underside of head and ventrally on abdomen, scale margins narrowly outlined with greyish brown. Dorsal saddles and vertical

**Table 4.** Frequency distribution of predorsal midline scale counts in northern Australian *Hypseleotris* species; data on other species from Hoese and Allen (1983).

| | Predorsal midline scale count | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Species | 0 | 2 | 3 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 23 |
| *H. aurea* | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 1 | 3 | 2 | 1 | - |
| *H. barrawayi* sp. nov. | 7 | - | 1 | 1 | - | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 3 | 4 | 3 | 1 | - | 1 | - | 1 |
| *H. compressa* | - | - | - | - | - | - | - | - | - | - | - | 3 | 5 | 10 | 5 | 1 | - | - | - | - |
| *H. ejuncida* | - | 1 | 1 | - | 1 | - | - | 1 | - | 2 | - | 1 | 2 | - | - | - | 1 | 1 | - | - |
| *H. kimberleyensis* | 14 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *H. regalis* | - | - | - | - | - | - | - | - | - | - | - | 10 | 9 | 2 | - | - | - | - | - | - |

**Table 5.** Frequency distribution of longitudinal scale counts in northern Australian *Hypseleotris* species; data on other species from Hoese and Allen (1983).

| | Longitudinal scale row count | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Species | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 37 | 38 | 39 | 40 | 43 |
| *H. aurea* | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 1 | 3 | 2 | 1 |
| *H. barrawayi* sp. nov. | - | - | - | - | - | - | 7 | 5 | 11 | 6 | 1 | - | - | - | - | - |
| *H. compressa* | - | 1 | 3 | 7 | 8 | 5 | - | - | - | - | - | - | - | - | | - |
| *H. ejuncida* | - | - | - | - | 1 | 3 | 4 | 3 | - | - | - | - | - | - | - | - |
| *H. kimberleyensis* | - | - | - | - | - | 8 | 1 | 3 | 2 | - | - | - | - | - | - | - |
| *H. regalis* | 5 | 8 | 9 | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Table 6.** Measurements (mm) of *Hypseleotris barrawayi* sp. nov.

| Character | Holotype | Mean | Minimum | Maximum | Mode |
|---|---|---|---|---|---|
| Head length | 8.4 | 8.4 | 13.7 | 6.5 | 7.3 |
| Head depth | 5.1 | 5.0 | 10.8 | 3.5 | 3.9 |
| Head width | 4.9 | 4.7 | 10.0 | 3.1 | 3.6 |
| Body depth at anus | 6.1 | 6.0 | 11.0 | 3.4 | 4.5 |
| Body depth at pelvic origin | 4.3 | 4.0 | 9.2 | 2.7 | 3.3 |
| Body width | 6.1 | 5.9 | 11.6 | 4.0 | 4.6 |
| Caudal peduncle length | 9.6 | 8.9 | 17.3 | 6.2 | 8.9 |
| Caudal peduncle depth | 3.6 | 3.6 | 6.8 | 2.5 | 2.8 |
| Snout length | 2.2 | 2.1 | 3.6 | 1.4 | 1.7 |
| Eye width | 2.5 | 2.4 | 3.8 | 1.9 | 2.1 |
| Jaw length | 2.5 | 2.5 | 4.7 | 1.7 | 2.5 |
| Interorbital width | 2.1 | 2.2 | 4.3 | 1.7 | 1.8 |
| Pectoral length | 7.4 | 7.0 | 10.9 | 5.0 | 6.8 |
| Pelvic length | 6.0 | 5.9 | 9.4 | 4.5 | 5.3 |
| Caudal length | 7.6 | 7.6 | 12.6 | 5.7 | 6.1 |
| Adpressed first dorsal length | 6.0 | 5.8 | 10.9 | 3.9 | 4.8 |

bars along side of body dusky to dark grey. Internal narrow pale golden-brown stripe running from eye nearly to mid-caudal fin base, following top of vertebral column. Short black vertical bar on lower base of caudal fin. Dark grey to bluish grey blotch on pectoral base. Broad diffuse dusky grey stripe running from lips through eye across upper part of preopercle and opercle, ending before pectoral fin base; lower half of head pale, may be indistinct thin grey stripe along preopercle behind end of jaws. Scattered spots or blotches of iridescent greenish, to bluish, to pinkish gold pigment may show through body wall of upper abdomen and side of head. Lips dusky grey to dark grey. Pupil surrounded by rim of pale gold, most of eye brown-gold to iridescent brown.

Dorsal and anal fins translucent dusky grey, with dull whitish to yellowish-grey band through centre of first dorsal fin and similar band along second dorsal fin but placed slightly below centre of fin; anal fin becoming darker grey distally; all these fins with narrow bluish white margin. Pectoral fins transparent. Pelvic fins translucent dusky to whitish grey, with bluish white edge to tips. Caudal fin translucent light dusky, with rows of pale brownish grey to pale golden-brown spots.

A freshly dead specimen in breeding condition (from photograph by Brad Pusey) was reddish brown on the anterior half of the body, greyish brown posteriorly, with very dark reddish-brown head, chest dark grey ventrally with pinkish-gold sides; first dorsal fin with proximal pale pink band, central dusky grey band and outer edge of fin bluish white; second dorsal fin translucent pink, with deep red-brown area proximally, broad blackish submarginal band along posterior half of fin and outer edge of fin white; anal fin dark reddish with broad submarginal grey band and narrow bluish white margin; caudal fin dark brown with golden brown spots.

**Distribution.** Known only from the upper reaches of the Katherine River system, Northern Territory (Gimbat, Jackys, Sleisbeck creeks and billabongs; main river at 'Elseya Falls' and Centipede Dreaming Gorge).

**Comparisons.** Upon first examination, it was considered that *Hypseleotris barrawayi* was very similar morphologically to *H. kimberleyensis* Hoese and Allen and *H. ejuncida* Hoese and Allen (Larson and Martin 1990). Thacker and Unmack (2005) confirmed this by presenting a phylogeny of 12 *Hypseleotris* species, including *H. barrawayi* (as '*H.* sp. nov. Katherine River'), based on N2 gene analyses and 20 morphological characters. Their consensus tree shows *H. barrawayi* to be sister to a group consisting of *H. ejuncida, H. kimberleyensis* and *H. regalis* (all three endemic to Kimberley river systems). This group of four species was in turn most closely related to *H. compressa*.

*Hypseleotris barrawayi* is a slender species, similar in appearance to *H. kimberleyensis*. Both have 26 vertebrae, but differ in that *H. barrawayi* may have scales scattered on the predorsal region while *H. kimberleyensis* has none;

**Fig. 3.** *Hypseleotris barrawayi* sp. nov., captive male specimen. Photograph by Neil Armstrong.

**Fig. 4.** *Hypseleotris barrawayi* sp. nov., captive female specimen. Photograph by Neil Armstrong.

*H. barrawayi* has a row of short dusky grey vertical bars along the mid-side of body while *H. kimberleyensis* has a series of X-shaped dark marks; *H. barrawayi* has the first and second dorsal fin with two broad dusky bands, one basal and one submarginal band, while *H. kimberleyensis* has a plain dark first dorsal fin and an almost plain second dorsal fin, with narrow whitish stripe along near-centre of the fin; *H. barrawayi* has the caudal fin usually plain or with few diffuse dusky bars or rows of spots, while *H. kimberleyensis* has a plain caudal fin, occasionally with two narrow wavy lines near the base.

*Hypseleotris barrawayi* is also related to *H. ejuncida*, which has 25 vertebrae. It differs from *H. ejuncida* by having 10–13 narrow bars crossing the dorsum and a finely reticulate pattern on the side of the body and narrow vertical grey bars on the posterior part of the body, while *H. ejuncida* has all body markings, including vertical bars on the anterior part of body darker and more distinct, appearing more 'patterned', with darker scale margins forming a diamond-shaped pattern. In *H. barrawayi* the first and second dorsal fins are banded with light and dark pigment, while in *H. ejuncida* the first dorsal fin is darker and less distinctly banded; the second dorsal fin is banded with a broken-up series of white and brown blotches, with one to two rows of white spots basally. In *H. barrawayi* the dark bar on the pectoral base is darkest dorsally, becoming more diffuse on the ventral part of the fin base, in *H. ejuncida* the pectoral base spot is more intense and usually covers the entire pectoral fin base. The caudal fin in *H. barrawayi* is plain or with rows of dusky

spots; in *H. ejuncida*, the caudal fin has rows of dark spots forming distinctly wavy bands (especially prominent in females). In morphology, *H. barrawayi* differs from *H. ejuncida* in having the preopercle scaled (versus usually naked in *H. ejuncida*), postdorsal scale count 8–10, usually 9 (versus 8–9, nearly always 8 in *H. ejuncida*) and lateral scale count 30–34, modally 32 (versus 28–31, modally 30 in *H. ejuncida*). The arrangement of the predorsal scales also differs: in *H. barrawayi* these scales are loosely scattered in a rough line along the midline of nape and/or scattered above the opercle and preopercle, not reaching to behind the eye, and are often absent altogether, while in *H. ejuncida* the predorsal is usually extensively scaled, the scales reaching forward to just behind the eye, with the nape midline often at least partially scaled (Hoese and Allen 1983).

Morgan *et al.* (2004) confirm that *H. kimberleyensis* is endemic to the upper reaches of the Fitzroy River system, Western Australia, as stated by Hoese and Allen (1983). *Hypseleotris ejuncida* is known only from the Prince Regent system (Hoese and Allen 1983), while *H. barrawayi* only occurs only in the upper reaches of the Katherine system. The only other *Hypseleotris* species found in the lower reaches of these rivers may be *H. compressa*, which inhabits coastal rivers from Caranarvon, Western Australia, to Nadgee, New South Wales (Hoese 2006).

**Ecology.** This species' preferred habitat is clear quiet water with sheltered places such as near steep banks with overhanging vegetation (e.g. *Pandanus aquaticus* and *Melaleuca argentea*), among bankside roots, submerged logs (Bywater 1988; pers. obs.). *Hypseleotris barrawayi* has been observed forming large loose schools along steep sides of the plunge pool at Edith Falls in the shade of overhanging vegetation (pers. obs.), or in low abundance and solitary, 'skipping about on the surface of boulders and inclined walls … not in the creek leading out however' (Brad Pusey, Griffith University, pers. comm.).

Pusey obtained the species from the main channel of the Katherine River at Centipede Dreaming Gorge, but not from a river channel site above the falls. He also got specimens from the junction of the main channel and tributary above the gorge on a previous occasion in the Katherine River (near Manyallaluk). *Hypseleotris barrawayi* was absent from Grace Creek (14°9.025'S, 132°45.886'E) near these two sites, however. Pusey observed that habitat use differed between sites depending on habitat type:

> 'In riverine sections they were associated with rootmasses and leaf litter close to the bank and aggregated together within about 20 cm of the root structures (much like *H. compressa* does). In the gorge sections where habitat was dominated by sheer bedrock walls and deep pools, *H. barrawayi* aggregations (100s of small fish < 2 cm) formed close to the walls. They were not present in the shallow bouldery sections of these pools where sooties and spangleds were abundant.'

The first specimens from Sleisbeck came from water with a conductivity of 38.00 uS/cm, pH of 7.29, 11.48 total hardness and 15.80 total alkalinity (Bywater in litt.). Dense schools of small juveniles and young adults have been observed in October and gravid females in August and October; the fish moved slowly in the school and were not easily panicked, remaining calm even when placed in a bucket or plastic bag (Bywater 1988; pers. obs.). They adapt readily to captivity.

John Bywater observed captive breeding of a pair at Ranger Uranium's Environmental Laboratory (Bywater 1988), reporting that:

> 'The male clears a site on a flat surface in the tank (in this case on the tank wall) and displays to the female. She is enticed to about 10 cm from the egg site where the male continues a vigorous display swimming parallel to the female and nudging her towards the egg site. At the egg site the female commences to lay while the male hovers parallel to her changing from side to side and quivering. Egglaying takes about four hours. At the conclusion of laying the male drives the female from the eggs and remains in close vicinity of the egg patch vigorously fanning the clutch and defending a territory around them. Egg patch size is about 20 mm diameter and contains about 180 eggs of about 0.3 mm diameter. Eggs were subject to fungus attack and did not hatch.'

Initial breeding attempts were in November coinciding with the beginning of the wet season and pairs laid a number of times over December and January. Problems with male egg eating or fungus attack resulted in no successful hatches. Breeding pairs' lengths ranged from 3–4 cm male and 3.5–4 cm female.

A recent attempt (19 September 2007) to obtain specimens of this fish from the disused Sleisbeck Mine pit failed to find any *Hypseleotris* at all in the pit, using bait traps, castnet and dipnets (David Wilson, Aquagreen, pers. comm.); the pit is scheduled to be dewatered and filled in as part of a rehabilitation program. Other fish were present in the pit: *Melanotaenia exquisita*, *Ambassis* sp., *Leiopotherapon unicolor* and *Mogurnda mogurnda*, suggesting that the apparent lack of *Hypseleotris* may just be due to chance. Small juveniles and two adult *H. barrawayi* were caught in the creek adjacent to the pit and are presently being reared by Dave Wilson.

**Etymology.** Named for the late Sandy Barraway, traditional owner of the Sleisbeck country, who had great knowledge of the fauna and stories associated with that country. A suggested common name for the fish is Barraway's carp gudgeon, athough Katherine gudgeon has been used informally for the species.

## ACKNOWLEDGMENTS

My many thanks to John Bywater, Hazel Nesbitt, Megan Bailey and Rex Williams for field assistance in gathering specimens of this fish; John Bywater also kindly provided field notes and observations. ERA and Australian National Parks and Wildlife Service provided logistical support during the 1991 Sleisbeck sampling, especially Terry Hill, Mick Sherwood and Larry Ah Ling. Thanks to Rob Muller of Environment Australia, for cultural assistance, and to Brad Pusey, Griffith University, for his observations. And thanks to Jeff Johnson (QM), Mark McGrouther (AMS) and Sue Morrison (WAM) for getting catalogue numbers to me so quickly.

## REFERENCES

Birdsong, R.S., Murdy, E.O. and Pezold, F.L. 1988. A study of the vertebral column and median fin osteology in gobioid fishes with comments on gobioid relationships. *Bulletin of Marine Science* **42**(2): 174–214.

Bywater, J. 1988. A survey of freshwater fish of Kakadu National Park. Unpublished report for Ranger Uranium Mines Pty Ltd. 33 pp, 19 plates.

Hoese, D.F. and Allen, G.R. 1983. A review of the gudgeon genus *Hypseleotris* (Pisces: Eleotridae) of Western Australia, with descriptions of three new species. *Records of the Western Australian Museum* **10**: 243–261.

Hoese, D.F. 2006. Eleotridae. Gudgeons, sleepers. Pp 1596–1611. In: Hoese, D.F., Bray, D.J., Paxton, J.R. and Allen, G.R. Fishes. In: Beesley, P.L. and Wells, A. (eds) *Zoological Catalogue of Australia. Volume 35.* Parts 1–3. ABRS and CSIRO Publishing: Canberra.

Hubbs, C.L. and Lagler, K.F. 1970. *Fishes of the Great Lakes Region.* University of Michigan Press: Ann Arbor.

Larson, H.K. and Martin, K.C. 1990. *Freshwater fishes of the Northern Territory.* Northern Territory Museum of Arts and Sciences, Handbook No. 1: Darwin.

Morgan, D.L., Allen, M.G., Bedford, P. and Horstmann, M. 2004. Fish fauna of the Fitzroy River in the Kimberley region of Western Australia – including the Bunuba, Gooniyandi, Ngarinyin, Nyikina and Walmajarri Aboriginal names. *Records of the Western Australian Museum* **22**: 147–161.

Thacker, C. and Unmack, P.J. 2005. Phylogeny and biogeography of the eleotrid genus *Hypseleotris* (Teleostei: Gobioidei: Eleotridae), with redescription of *H. cyprinoides*. *Records of the Australian Museum* **57**: 1–13.

Wilson, D. and Brooks, S. 2004. Pp 1–29. In: Trans Territory underground pipeline Wadeye to Gove in the Northern Territory. Appendix J. Aquatic fauna study.

Accepted 19 November 2007